DOCUMENT RESUME

ED 104 374 IR 001 768

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TITLE Gaming and "Functional Democracy".
PUB DATE Apr 75
NOTE 16p.; Paper presented at the Annual Meeting of the American Educational Research Association (Washington, D.C., March 30-April 3, 1975)

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS Adoption (Ideas); Decision Making; *Democracy; *Democratic Values; *Educational Games; Game Theory; *Group Dynamics; Skill Development
IDENTIFIERS Consensus

ABSTRACT

An example of the way gaming can be used to bring attention to, and improve skills in, making democracy function better is presented. The game is played by seven people seated around two triangular playing boards; it involves making choices among least, intermediate, and most preferred alternatives, keeping the preferences of the majority in balance with the preference of the minority. The game is designed to provide experience with new ideas about democracy, such as a system of "value voting." (Author/KKC)

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GAMING AND "FUNCTIONAL DEMOCRACY"

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April, 1975

The Concept of "Functional Democracy"

Not only do educational institutions aim to develop leaders for society, they also aim to develop people skilled in playing the many other roles required of an enlightened citizenry. If democracy is to exist in a meaningful way in a complex society, attention must be focused on the problem of getting large numbers of people to see that superficial understanding of the principles of democracy and intuitive interpretations of the way things ought to or will turn out are not enough.

Many games used in educational settings have as explicit or implicit goals the hope of upgrading the participants' understanding of the way groups work, the way institutions work, or even the way societies work. Sometimes, as in the case of Metro-Apex, these are based on relatively complex models which purport to reflect the dynamics of that part of society under consideration. Sometimes, as with Starpower, they simply involve a few carefully chosen rules which point up the way people are likely to treat one another.

The approach taken in the work described in this paper is to concentrate on one very important problem, which

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is crucial to the democratic process itself, namely, the problem of balancing the preferences of the majority with the preferences of the minority. It grows out of a careful analysis of the difficulties associated with various schemes for choosing one alternative from several, and is based on a particular method which shows promise as a way of improving a group's choices. It seems appropriate to involve gaming in this effort, for the concepts, although in one sense "simple," are in another sense quite difficult to grasp and, unfortunately, frequently run counter to intuition. Gaming may provide a way for people to gain experience with the ideas, to compare the outcome of their intuitive efforts with the results obtained by employing the particular method of decision-making under consideration.

Thus gaming is being used as a means of communicating with people about a very basic element of a well-governed community. Everything except the barest bones of the process under consideration is stripped away. The absolute minimum of rules and artifacts are used to help focus on the rudimental nature of the process. The idea is to work very self-consciously to make people more "literate" with respect to democracy. Much effort has been spent to make people "functionally literate." There is a sense in which this work can be seen as an effort in "functional democracy" as contrasted

to "functional literacy." Quite possibly people who are very literate indeed are not very sophisticated when it comes to understanding the functioning dynamics of democracy.

This is a preliminary report; our work in this area is just beginning. The literature in the field is richly suggestive of possible gaming exercises. Two articles alone could yield dozens of games, each of which could be used to involve people in understanding one or two important ideas.[1] Indeed the exercise presented here would probably be much more successful if there were a preliminary exercise designed to facilitate fuller understanding of the basic ideas of utility theory. The intention is simply to offer the rationale for, and an example of, a way in which gaming can be used to bring attention to, and improve skill in, making democracy function better. The next section can be skimmed by those interested only in the general idea, but is presented in some detail for those who wish to go beyond generalizations.

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[1] John Platt, "Social Traps," American Psychologist, Vol. 28, No. 8, August, 1973, pp. 641-651; and Amos Tversky and Daniel Kahneman, "Judgment Under Uncertainity: Heuristics and Biases," Science, Vol. 185, September, 1974, pp. 1124-1131.

Description of the Exercise

Seven people are seated around two triangular playing boards at the start of the exercise.

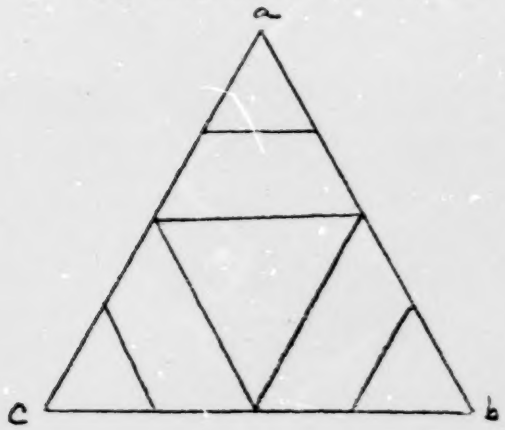

Figure 1

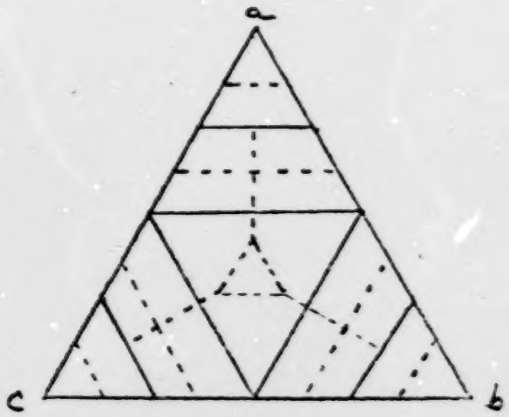

Figure 2

Seven cards, numbered on their backs from 1 to 7, are placed in each of the seven zones shown in Figure 1. On the face of each card appears a long thin rectangle in which three letters, a, b, and c are printed. The letters represent three alternatives under consideration by the players. The letter appearing at the left end of the rectangle represents the alternative preferred the most by that player; the letter appearing at the right end represents the alternative preferred the least by that player. The letter printed between the other two letters represents the intermediate alternative and its position specifies the relationship it bears to the other two alternatives. The closer it is printed to the

most preferred letter, the more the player is alledged to prefer it. Actually, the letters have been assigned values, the most preferred being 100, the least preferred being 0, and the intermediate a value such as 80. (The player never sees the actual numbers.) If the number were 80, the intermediate letter would be printed in a position which is one-fifth of the way from the left end of the rectangle and four-fifths from the right. This is taken to mean that the player is indifferent between the intermediate alternative and a situation in which the odds of getting the most preferred alternative are 4:1 relative to the least preferred. It is as if the intermediate letter is the fulcrum of a lever and it would take in order to balance the situation four times as much weight on the most preferred end of the level as it would on the least preferred end. The placement of the "fulcrum letter" closer and closer to the left end means that one is indifferent between that letter and a situation in which the odds get heavier and heavier in favor of the letter at the left end as contrasted to the letter out on the right end. To be indifferent between the "fulcrum letter" and such a situation is tantamount to saying that it scarcely matters whether the "fulcrum letter" or the one on the left is chosen, both are strongly preferred relative to the least preferred. This, of course, is the standard way of treating alternatives when assigning them "utilities" in utility theory.

In order to try to demonstrate some of the main features of utility theory, features which are very important for people to understand, the rectangles are printed in different positions on the cards and are of differing lengths. This is done to illustrate the point that one person might like both his "most" and "least" preferred options quite a bit, the entire rectangle being printed towards the left side of the card, and another person might like his "most" and "least" preferred options hardly at all, the rectangle being printed on the right side of the card. Further, the "distance" between one person's "most" and "least" preferred alternatives may be great and the "distance" between another person's preferences for the same alternatives, even though that person ranks the two in the same order as the other person, may be very slight--as represented by long and short rectangles.

At the start of the game each player picks up his/her numbered card from the pile of seven located in the central triangle of the board (Figure 1). The other packs of seven remain face down in the other six zones. Thus each player learns his/her preferences for the three alternatives as stated at the start of the first round.

These preferences may change prior to the time the decision to choose one of them is made at the end of the

round. Preference change is simulated by the movement of a marker on the other playing board (Figure 2). The marker begins in the dotted triangle inside the central triangle. According to rules specified below, the marker may be moved one space at a time in any direction by a player. ("Spaces" are the smaller areas depicted in Figure 2, i.e., the "zones" of Figure 1 subdivided by the dotted lines.) Whenever the marker crosses a solid line and moves into a new zone, the players return their preference cards to the zone from which the marker has just come and pick up new cards from the zone into which the marker has just moved. (Of course the marker moves on one board and the cards are picked up and layed down on the other board.)

Since there are letters at each point of the large triangle that forms the boards, it follows that movement towards the letter a is taken to mean that there is an attempt to move the group's preferences towards a, away from the initial relatively neutral position and away from b and c. Whether such efforts are effective, and how effective they are, is a function of the way the game designer has designed the cards. In general, the letters on cards which are stored in the triangular zone closest to the letter a on the playing board form a pattern over the seven players' cards which represents the most favorable arrangement of the letter a found

in that round's seven packs. (A new deck of seven packs is provided for each of ten rounds.)

Thus the players always learn the outcome of shifts in preferences; at least each player learns how his/her own preferences shift, if they shift. Whether this information is shared depends on the way players choose to cooperate or compete.

Rules governing who may move to shift preferences and how a decision is to be made on one of the alternatives involve another deck of cards. This deck is composed of cards containing players' numbers, two cards for each player; cards on which decision rules appear (one rule on each of eight cards); and one card on which the word "shuffle" is printed.

That deck is shuffled and the top card is turned face up. If the card contains the number of a player, that player may move the marker on the playing board one space in any direction. The player need not move; he/she may pass. The object of moving the marker is to attempt to shift the group's preferences in the direction moved, i.e., in a direction that the player moving the marker judges favorable to him/her in light of the preferences stated on his/her card and/or in light of any arrangements he/she might have made with other players. After that player takes his/her turn, the card is returned to the bottom of the deck and the next card is turned face up.

If the exposed card contains a decision rule, any player may attempt to get the group to agree to make a decision at this point and make it according to the decision rule stated on the card. To do this, a player simply asks if two people will join him/her in requesting that the decision be made. This permits a minority of three players to force a decision at a particular point, assuming perhaps that the decision made under a particular rule with the preferences fixed as they are would be a decision that might be more advantageous to them than a decision made some other way at a later time. The eight decision rules provided initially are:

1. Simple majority (vote simultaneously on a, b and c).
2. Simple plurality (vote simultaneously on a, b and c).
3. Vote on a, yes or no (four "yes" votes win).
4. Vote on b, yes or no (four "yes" votes win).
5. Vote on c, yes or no (four "yes" votes win).
6. Vote on a vs. b, then winner vs. c.
7. Vote on a vs. c, then winner vs. b.
8. Vote on b vs. c, then winner vs. a.

It should be noted that a minority of three people are not always in a position to force a decision which might be favorable to them. The decision is partially a matter of chance, for a particular decision rule card must be exposed by chance before that rule can even be considered for adoption. This scheme is designed to call attention to a variety of decision rules and to get players to examine the relative advantages of different rules. Players can plan ahead to some extent for once a particular decision rule card is exposed and not utilized (either because no one seeks its adoption or because someone does but two others do not join him/her), that card goes to the bottom of the pack and probably will not come up again until all other decision rule cards are exposed. However, this may not be the case, for if the card marked "shuffle" is turned up, the deck is shuffled and any card has an equal chance of being exposed anew.

If a vote is called for, it is simply executed by players marking their ballots with the letter a, b, or c, or yes or no, the vote to be conducted by the rule on the exposed card. The alternative chosen is marked on a slip of paper and placed off to one side with the seven preference cards which the players were holding at the time of the vote. The relative merits of that outcome can thus be compared to the merits of a possibly different outcome which will be

determined after the game has ended. Actually, this is the objective of the entire exercise, for after a number of rounds are played, six to ten rounds perhaps, the decisions actually made in those rounds are compared to the decisions which would have been made had an altogether different decision rule been utilized each round. This decision rule is called "value voting" and will be described in the next section.

The process of comparing the outcomes under "value voting" and under the various decision rules employed is a matter of laying out the seven preference cards which were in effect at each decision point adjacent to the slip containing the original decision--to which is added the decision which would have been made had "value voting" been used. The "value voting" decisions are actually made by drawing markers from a hat and consulting probability tables calculated in advance.

The relative advantages and disadvantages of having adopted one alternative rather than the other, if the two procedures yielded different outcomes, are then discussed. Did the letter of the alternative adopted under "value voting" appear at the very left of more players' rectangles than did the letter actually adopted during the play? On how many rounds did this happen? What patterns of distribution of letters are discernible over the six to ten rounds when one

examines the winning letters under "value voting"?--under the decision rules actually utilized?--and so on.

Of course, once "value voting" is understood and exists in players' minds as a possible way of making a decision, the fact that it could be used or was used in an early round could affect how people behaved in subsequent rounds. To experiment with this is simply to add one or more decision rule cards marked "value voting" to the deck of cards and replay the game.

Within the play of any game it should be remembered that a new set of preference cards is employed each round. A feature of the exercise not yet indicated is that the first six rounds involve choosing from among three alternatives. The last four rounds are played with four alternatives. This not only requires a pair of diamond shaped playing boards, it requires the addition of a few more decision rule cards, the logical extensions of pair-wise voting, etc.

The "Value Voting"
Decision Rule

"Value voting" involves two ideas which depart significantly from familiar voting principles. The process, developed by Merrill M. Flood, is presented in some detail in his paper, Implicit Intransitivity Under Majority Rule with

Mixed Motions.[2] The account presented here is designed to suggest the main features of the idea.

First, voters are permitted to express themselves on several alternatives at once and do so in a way which portrays the relative strength of their preferences. In normal voting techniques one can only say that a is preferred over both b and c. If "preferential balloting" is used, the three alternatives may be ordered, but in value voting not only may they be ordered, ideas such as a and b are very close and c is a "distant third" can be expressed. This is done by assigning cardinal utilities to each alternative.

Second, the utilities assigned to each alternative by each voter are processed in such a way that a percentage is assigned to each alternative. The probability that a particular alternative should be chosen is expressed by the percentage assigned to it. If there were only two alternatives and the voters cast an equivalent number of votes for each, it would be entirely within our experience to declare that the decision should be made by flipping a coin. This is to say that the probability assigned to each alternative is 50% and the decision is made by a device designed to reflect those odds.

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[2]Working Paper, Faculty Research Program on University Governance, The University of Michigan (FRPUG/MMF 24).

"Value voting" simply involves an extension of this notion. Once the probabilities are calculated for each alternative, the choice is to be made by a device such as a hat filled with 100 numbered markers. One is drawn, and its number determines which alternative is adopted (assuming that each alternative is assigned numbers according to their probabilities).

The process by which the percentages, the probabilities, are assigned to each alternative involves the maximization of the geometric mean of the utilities. This calculation is impossible without a computer, thus making "value voting" impossible without a computer. The general idea is that one begins with the assumption that each alternative should be treated as equally probable, i.e., 33 1/3% should be assigned to each one. Each utility assigned by a voter is then multiplied by .333, the results summed for each voter, the sums multiplied and the result recorded. The percentages are then altered sequentially in search of the largest product which can be achieved by this process. When the largest product is determined, the percentages used to achieve it are the percentages assigned to the alternatives.

Thus "value voting" provides the voters with results which, if used consistently over a long period of time, would result in the adoption of alternatives which would serve both

majority and minority interests and do so in a way which is proportional to the number of people valuing each alternative and the relative strengths of the preferences held.

Simple though this idea is in some respects, it proves to be a difficult idea to get people to understand and consider seriously. The purpose of the exercise described herein is to allow a group to compare the results of their behavior with the results which would be achieved by using "value voting" in an effort to get them to consider the relative merits of such an idea.

Summary

Some ideas about democracy are sufficiently unusual that it is difficult for people to seriously contemplate adopting them. Games designed to provide experience with such ideas may play a significant role in getting people to open their minds to further consideration of alternatives. One exercise depicting one new idea for relating majority and minority interests is presented. Thus the door to a new use for gaming is opened a crack.